SEC 0

Review CAP

United States Environmental Protection Agency

Office of Solid Waste and Emergency Response

EPA

DIRECTIVE NUMBER: 9902.3

TITLE: RCRA CORRECTIVE ACTION PLAN

APPROVAL DATE: November 14, 1986

EFFECTIVE DATE: November 14, 1986

ORIGINATING OFFICE: OWPE

☒ **FINAL**

☐ **DRAFT**

LEVEL OF DRAFT

- ☐ A — Signed by AA or DAA
- ☒ B — Signed by Office Director
- ☐ C — Review & Comment

REFERENCE (other documents):

SWER OSWER OSWER
DIRECTIVE DIRECTIVE DI

United States Environmental Protection Agency
Washington, D.C.

EPA OSWER Directive Initiation Request

1. Directive Number: 9902.3

2. Originator Information

Name of Contact Person	Mail Code	Office	Telephone Number
Mark Gilbertson	WH-527	OWPE/RCRA Enf. Div.	382-4849

3. Title

RCRA Correction Action Plan

4. Summary of Directive (Include brief statement of purpose) The RCRA Corrective Action Plan is intended to aid the Regions and States in determining and directing the specific work which must be performed as part of a complete corrective action program. It provides a technical framework for use during the development of Corrective Action Orders and corrective action permit requirements.

5. Keywords

RCRA, Corrective Action, RCRA Facility Investigation, Corrective Measure Study, Corrective Measure Interpretation

6a. Does this Directive Supersede Previous Directive(s)? ☐ Yes ☒ No What directive (number, title)

b. Does it Supplement Previous Directive(s)? ☐ Yes ☒ No What Directive (number, title)

7. Draft Level

☐ A — Signed by AA/DAA ☒ B — Signed by Office Director ☐ C — For Review & Comment ☐ In Development

This Request Meets OSWER Directives System Format

8. Signature of Lead Office Directives Coordinator	Date
Deborah K. Stroud	11-17-86
9. Name and Title of Approving Official	Date

OSWER DIRECTIVE OSWER DIRECTIVE OSWER DIRECTIVE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

NOV 14 1986

OFFICE OF
SOLID WASTE AND EMERGENCY RESPONSE

MEMORANDUM

OSWER DIRECTIVE #9902.3

SUBJECT: Interim Final Corrective Action Plan

FROM: Gene A. Lucero, Director Gene A. Lucero
Office of Waste Programs Enforcement

Marcia Williams, Director Marcia Williams
Office of Solid Waste

TO: Addressees

Attached is the interim final guidance document entitled the Corrective Action Plan (CAP). The CAP will assist you in development of Corrective Action Orders (§ 3008(h)) and corrective action requirements in permit applications and permits (§ 3004(u)&(v)). The purpose of the CAP is to aid Regions and States in determining and directing the specific work the owner/operator or respondent must perform, as part of a complete corrective action program. The CAP should be used as a technical framework during the development of Corrective Action Orders and corrective action permit requirements. As specific, detailed guidance is issued by EPA Headquarters, the CAP will be modified to reflect and incorporate these documents.

The CAP provides a framework for the development of a site-specific schedule of compliance to be included in a permit or a compliance schedule in a Corrective Action Order. It does so by laying out scopes of work for the three essential phases of a complete corrective action program. These three phases and their objectives are as follows:

Phase I - RCRA Facility Investigation (RFI) - to evaluate thoroughly the nature and extent of the release of hazardous waste and hazardous constituents and to gather necessary data to support the Corrective Measure Study.

Phase II - Corrective Measures Study (CMS) - to develop and evaluate a corrective measure alternative or alternatives and to recommend the final corrective measure or measures.

Phase III - Corrective Measures Implementation (CMI) - to design, construct, operate, maintain and monitor the performance of the corrective measure or measures selected.

The CAP is consistent with existing guidance documents as well as those currently under development at Headquarters. These documents are listed below:

Existing:

- §3008(h) Policy Guidance on Interim Status Corrective Action Authority (10/85);
- Draft Interim Measure Guidance (12/85);
- Draft §3008(h) Model Order (12/85);
- Draft National RCRA Corrective Action Strategy (9/86); and
- RCRA Facility Assessment Guidance (10/86).

Under Development:

- RCRA Facility Investigation (RFI) Guidance - will provide the Owner/ Operator [Respondent] with various levels of investigation techniques to choose from in developing a site-specific work plan to fully characterize releases.
- Corrective Measure (CM) Guidance - will provide the Owner/ Operator [Respondent] with criteria and technical information for evaluating and selecting the measure or measures that will meet specific clean-up levels.

The CAP provides an overall model for a corrective action compliance schedule. The scopes of work contained in the CAP should not be considered "boilerplate", but rather as a "menu" of possible activities to be required on a site-specific basis. Only those tasks and reports necessary and appropriate to the specific situation should be required of the Owner/Operator [Respondent]. We also encourage the Regions to make available to the Owner/Operator [Respondent] existing model plans that are relevant to RCRA activities. For example, the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activites Operating Safety Guidelines" contains a model that can be used for the Health and Safety Plan outlined in the CAP.

A RCRA Facility Assessment (RFA) will have been conducted at the facilities that are to receive permits, and for some facilities which are issued §3008(h) Orders. The results of the RFA should be used as the basis for focusing the RCRA Facility Investigation (RFI) compliance schedules for individual sites, and should provide the necessary data for completion of the "background information" components of the CAP.

Finally, we feel it is necessary to stress the importance of site-specific technical detail in the development of Corrective Action Orders and corrective action permit requirements. Each facility has unique characteristics and circumstances affecting it that need to be incorporated into any requirements for corrective action. Without this up-front detail, many owner/operators or respondent will provide us with submittals which lack the technical detail necessary to perform a thorough corrective measure program. In addition to providing a detailed scope of work, the Agency should also propose a site-specific time-frame for completion of the work. Enforcement of permit conditions or requests for relief in an Order is always easier when very specific detail is included. Without a detailed schedule of compliance in a permit or a compliance schedule in a Corrective Action Order, we can expect untimeliness in submittals and actions.

It was also intended that the model scopes of work in the CAP foster timely, concise submissions by Owner/Operators. Therefore, when modifying these scopes of work with site-specific information, the scopes of work should only require that information which is necessary for the subject facility, thereby minimizing the number and length of Owner/Operator submitions and our review time. (In general, the average length of individual Owner/Operator submittals should not exceed 20 pages, excluding appendices.)

Please note that the CAP addresses comments by lead Regions. We would appreciate additional comments based upon your experiences in using the CAP. Should you have any questions with regard to this document, you may call Anna Buonocore (FTS 382-4829), Mark Gilbertson (FTS 382-4849) or Peter Ornstein (FTS 382-5618).

Attachment

ADDRESSEES:

Hazardous Waste Management Division Directors - Regions I-X
Hazardous Waste Branch Chiefs - Regions I-X
Enforcement Section Chiefs - Regions I-X
Permit Section Chiefs - Regions I-X
Regional Counsels - Regions I-X
Lloyd Guerci, OWPE
Steve Heare, OWPE
Sylvia Lowrance, OWPE
Frank Russo, OWPE
Peter Cook, OWPE
Bruce Weddle, OSW
Dave Fagan, OSW
Terry Grogan, OSW
George Dixon, OSW
Art Day, OSW

RCRA CORRECTIVE ACTION PLAN

INTERIM FINAL

November 1986

RCRA CORRECTIVE ACTION PLAN

- INTRODUCTION

- RCRA FACILITY INVESTIGATION

  Task I: Description of Current Conditions

  Task II: Pre-Investigation Evaluation of Corrective Measure Technologies

  Task III: RFI Workplan Requirements

  Task IV: Facility Investigation

  Task V: Investigation Analysis

  Task IV: Laboratory and Bench-Scale Studies

  Task VII: Reports

- CORRECTIVE MEASURE STUDY

  Task VIII: Identification and Development of the Corrective Measure Alternative or Alternatives

  Task IX: Evaluation of the Corrective Measure Alternative or Alternatives

  Task X: Justification and Recommendation of the Corrective Measure or Measures

  Task XI: Reports

- CORRECTIVE MEASURE-IMPLEMENTATION

  Task XII: Corrective Measure Implementation Program Plan

  Task XIII: Corrective Measure Design

  Task XIV: Corrective Measure Construction

  Task XV: Reports

INTRODUCTION

The objective of a Corrective Action Program at a hazardous waste management facility is to evaluate the nature and extent of the release of hazardous waste or constituents; to evaluate facility characteristics; and to identify, develop, and implement the appropriate corrective measure or measures adequate to protect human health and the environment. The following bullets identify components necessary to assure a complete corrective action program. It should be recognized that the detail required in each of these steps will vary depending on the facilty and its complexity:

- Locate the source(s) of the release(s) of contaminants (e.g. regulated units, solid waste management units, and other source areas)

- Characterize the nature and extent of contamination both within the facility boundaries and migrating from the facility. This would include defining the pathways and methods of migration of the hazardous waste or constituents, including the media, extent, direction, speed, complicating factors inflencing movement, concentration profiles, etc.

- Identify areas and populations threatened by releases from the facility

- Determine short and long term, present and potential threats of releases from the facility on human health and/or the environment

- Identify and implement a interim measure or measures to abate the further spread of contaminants, control the source of contamination, or otherwise control the releases themselves

- Evaluate the overall integrity of containment structure and activities at the site intended for long-term containment

- Identify, develop, and implement a corrective measure or measures to prevent and remediate releases of hazardous waste or constituents from the facility

- Design a program to monitor the implementation, maintenance and performance of any interim or final corrective measure(s) to ensure that human health and the environment are being protected

The purpose of the Corrective Action Plan (CAP)is to aid Regions and States in determining and directing the specific work the owner/operator or respondent must perform, as part of a complete corrective action program. The Corrective Action Plan is a document specifically intended to assist Regions and States in the development of Corrective Action Orders (§ 3008(h)) and corrective action requirements in permit applications and permits (§ 3004(u)&(v)). It does so by laying out scopes of work for the three essential phases of a complete corrective action program which can be used to formulate facility-specific scopes of work for a order or

permit. These three phases and their objectives are as follows:

Phase I - RCRA Facility Investigation (RFI) - to evaluate thoroughly the nature and extent of the release of hazardous waste and hazardous constituents and to gather necessary data to support the Corrective Measure Study.

Phase II - Corrective Measures Study (CMS) - to develop and evaluate corrective measure alternative or alternatives and to recommend the final corrective measure or measures.

Phase III - Corrective Measures Implementation (CMI) - to design, construct, operate, maintain and monitor the performance of the corrective measure or measures selected.

Users of the CAP should understand that it is designed to identify actions that facility owner/operator or respondent must take as part of a corrective action program. It does not identify the steps that remain the responsibility of the regulatory agency. To clarify this interaction between the facility owner/operator or respondent, Figure 1 represents the flowchart of owner/operator or respondent submittals and Agency actions for the three phases of the CAP.

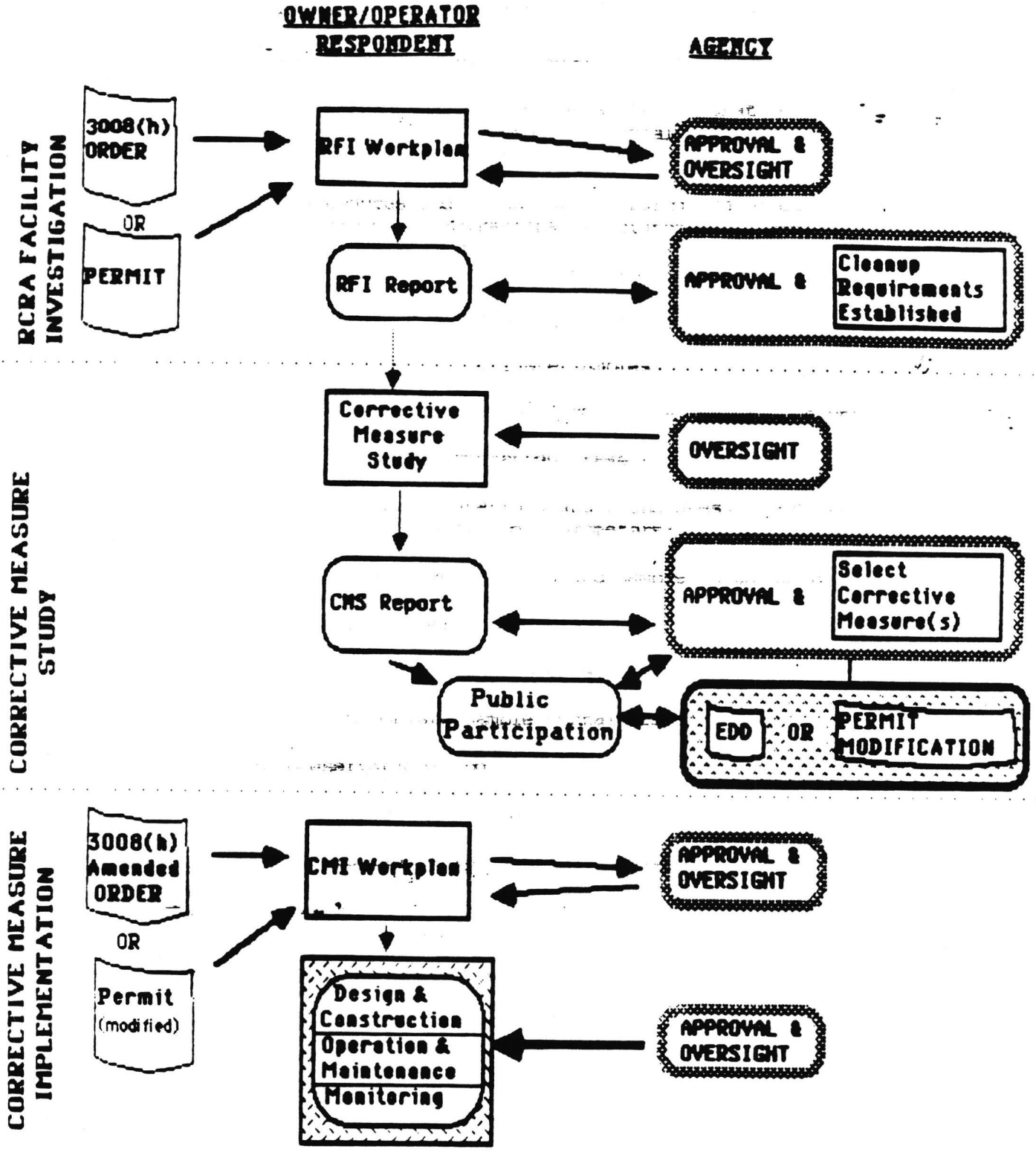
The CAP scopes of work should not be considered "boilerplate." The scopes of work in the CAP are models and must be modified, enhanced or sections deleted based on site-specific situations. Information generated from investigations such such as RCRA Facility Assessments (RFAs) should be used to tailor the scope of work to address facility-specific situations. The following are some examples where site-specifics require modification to the CAP model scopes of work.

- If the contamination problem at a facility is merely a small soil contamination problem, then the CAP should be scaled down accordingly.
- In complicated contamination situations, the Health and Safety Plan and Community Relations Plans may need to be comprehensive. However, in simple contamination situations, these plans may be very brief.
- If site-specifics conditions require more detail than what has been scoped out in any particular section of the CAP, then the CAP should be enhanced accordingly.
- If there is sufficient information on a site to preclude an air release, then it would not be necessary to require the owner/operator or respondent to perform an air contamination characterization. The air contamination characterization work under the RFI (Task IV, C, 4) should be deleted.

Figure 1.

9902.3

RCRA Corrective Action Plan



- If interim measures are underway, scheduled or contemplated at a facility, then the Interim Measures section under the RFI (Task I, C) should be modified to specifically reference the interim measures.

- If possible, the CAP should focus the owner/operator or respondent on specific solid waste management units and other areas of interest, as well as known waste management activity areas (i.e. waste recycling units, wastewater treatment tanks).

- If only one corrective measure alternative is appropriate for a given situation, and it would not be necessary to require the owner/operator or respondent to further investigate the possibility of other corrective measure alternatives, then the scopes of work (citations) would be modified to reflect this situation.

Finally, it is necessary to stress the importance of site-specific technical detail in the development of Corrective Action Orders and corrective action permit requirements. When the scope of work is specific to the facility, it is easier to enforce. Each facility has unique characteristics and circumstances affecting it that need to be incorporated into any requirements for corrective action. Without this many owner/operators or respondents will provide us with submittals which lack the necessary information to perform a corrective measure program. In addition to providing a adequate scope of work, the Agency should also propose a site-specific time-frame for completion of the work.

SCOPE OF WORK FOR A RCRA FACILITY INVESTIGATION (RFI) AT [SPECIFY FACILITY NAME]

PURPOSE

The purpose of this RCRA Facility Investigation is to determine the nature and extent of releases of hazardous waste or constituents from regulated units, solid waste management units, and other source areas at the facility and to gather all necessary data to support the Corrective Measures Study. The Owner/Operator [Respondent] shall furnish all personnel, materials, and services necessary for, or incidental to, performing the RCRA remedial investigation at [specify facility name].

[NOTE: This scope of work is intended to foster timely, concise submissions by Owner/Operators. To achieve this goal, it is important when using the model scope of work to consider facility specific conditions. This scope of work should be modified as necessary to require only that information necessary to complete the RCRA Facility Investigation.]

SCOPE

The RCRA Facility Investigation consists of seven tasks:

Task I: Description of Current Conditions

- A. Facility Background
- B. Nature and Extent of Contamination
- C. Implementation of Interim Measures

Task II: Pre-Investigation Evaluation of Corrective Measure Technologies

Task III: RFI Workplan Requirements

- A. Project Management Plan
- B. Data Collection Quality Assurance Plan
- C. Data Management Plan
- D. Health and Safety Plan
- E. Community Relations Plan

Task IV: Facility Investigation

- A. Environmental Setting
- B. Source Characterization
- C. Contamination Characterization
- D. Potential Receptor Identification

Task V: Investigation Analysis
- A. Data Analysis
- B. Protection Standards

Task VI: Laboratory and Bench-Scale Studies

Task VII: Reports
- A. Preliminary and Workplan
- B. Progress
- C. Draft and Final

TASK I: DESCRIPTION OF CURRENT CONDITIONS

The Owner/Operator [Respondent] shall submit for U.S. EPA approval a report providing the background information pertinent to the facility, contamination and interim measures as set forth below. The data gathered during any previous investigations or inspections and other relevant data shall be included.

A. Facility Background

The Owner/Operator's [Respondent's] report shall summarize the regional location, pertinent boundary features, general facility physiography, hydrogeology, and historical use of the facility for the treatment, storage or disposal of solid and hazardous waste. The Owner/Operator's [Respondent's] report shall include:

1. Map(s) depicting the following:

   a. General geographic location;

   b. Property lines, with the owners of all adjacent property clearly indicated;

   c. Topography and surface drainage (with a contour interval of [number] feet and a scale of 1 inch = 100 feet) depicting all waterways, wetlands, floodplains, water features, drainage patterns, and surface-water containment areas;

   d. All tanks, buildings, utilities, paved areas, easements, rights-of-way, and other features;

   e. All solid or hazardous waste treatment, storage or disposal areas active after November 19, 1980;

   f. All known past solid or hazardous waste treatment, storage or disposal areas regardless of whether they were active on November 19, 1980;

   g. All known past and present product and waste underground tanks or piping;

   h. Surrounding land uses (residential, commercial, agricultural, recreational); and

   i. The location of all production and ground-water monitoring wells. These wells shall be clearly labeled and ground and top of casing elevations and construction details included (these elevations and details may be included as an attachment).

   All maps shall be consistent with the requirements set forth in 40 CFR §270.14 and be of sufficient detail and accuracy to locate and report all current and future work performed at the site;

2. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage and disposal activities at the facility;

3. Approximate dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location where spilled, and a description of the response actions conducted (local, state, or federal response units or private parties), including any inspection reports or technical reports generated as a result of the response; and

4. A summary of past permits requested and/or received, any enforcement actions and their subsequent responses and a list of documents and studies prepared for the facility.

B. Nature and Extent of Contamination

The Owner/Operator [Respondent] shall prepare and submit for U.S. EPA approval a preliminary report describing the existing information on the nature and extent of contamination.

1. The Owner/Operator's [Respondent's] report shall summarize all possible source areas of contamination. This, at a minimum, should include all regulated units, solid waste management units, spill areas, and other suspected source areas of contamination. For each area, the Owner/Operator [Respondent] shall identify the following:

   a. Location of unit/area (which shall be depicted on a facility map);

   b. Quantities of solid and hazardous wastes;

   c. Hazardous waste or constituents, to the extent known; and

   d. Identification of areas where additional information is necessary.

2. The Owner/Operator [Respondent] shall prepare an assessment and description of the existing degree and extent of contamination. This should include:

   a. Available monitoring data and qualitative information on locations and levels of contamination at the facility;

   b. All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, water quality, meterology, and air quality; and

   c. The potential impact(s) on human health and the environment, including demography, ground-water and surface-water use, and land use.

C. Implementation of Interim Measures

The Owner/Operator [Respondent's] report shall document interim measures which were or are being undertaken at the facility. This shall include:

1. Objectives of the interim measures: how the measure is mitigating a potential threat to human health and the environment and/or is consistent with and integrated into any long term solution at the facility;

2. Design, construction, operation, and maintenance requirements;

3. Schedules for design, construction and monitoring; and

4. Schedule for progress reports.

TASK II: PRE-INVESTIGATION EVALUATION OF CORRECTIVE MEASURE TECHNOLOGIES

Prior to starting the facility investigation, the Owner/Operator [Respondent] shall submit to EPA a report that identifies the potential corrective measure technologies that may be used on-site or off-site for the containment, treatment, remediation, and/or disposal of contamination. This report shall also identify any field data that needs to be collected in the facility investigation to facilitate the evaluation and selection of the final corrective measure or measures (e.g., compatibility of waste and construction materials, information to evaluate effectiveness, treatability of wastes, etc.).

TASK III: RFI WORKPLAN REQUIREMENTS

The Owner/Operator [Respondent] shall prepare a RCRA Facility Investigation (RFI) Workplan. This RFI Workplan shall include the development of several plans, which shall be prepared concurrently. During the RCRA Facility Investigation, it may be necessary to revise the RFI Workplan to increase or decrease the detail of information collected to accomodate the facility specific situation. The RFI Workplan includes the following:

A. Project Management Plan

The Owner/Operator [Respondent] shall prepare a Project Management Plan which will include a discussion of the technical approach, schedules, budget, and personnel. The Project Management Plan will also include a description of qualifications of personnel performing or directing the RFI, including contractor personnel. This plan shall also document the overall management approach to the RCRA Facility Investigation.

B. Data Collection Quality Assurance Plan

The Owner/Operator [Respondent] shall prepare a plan to document all monitoring procedures: sampling, field measurements and sample analysis performed during the investigation to characterize the environmental setting, source, and contamination, so as to ensure that all information, data and resulting decisions are technically sound, statistically valid, and properly documented.

1. Data Collection Strategy

The strategy section of the Data Collection Quality Assurance Plan shall include but not be limited to the following:

a. Description of the intended uses for the data, and the necessary level of precision and accuracy for these intended uses;

b. Description of methods and procedures to be used to assess the precision, accuracy and completeness of the measurement data;

c. Description of the rational used to assure that the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition or an environmental condition. Examples of factors which shall be considered and discussed include:

i) Environmental conditions at the time of sampling;

ii) Number of sampling points;

iii) Representativeness of selected media; and

iv) Representativeness of selected analytical parameters.

d. Description of the measures to be taken to assure that the following data sets can be compared to each other:

   i) RFI data generated by the Owner/Operator over some time period;

   ii) RFI data generated by an outside laboratory or consultant versus data generated by the Owner/Operator;

   iii) Data generated by separate consultants or laboratories; and

   iv) Data generated by an outside consultant or laboratory over some time period.

e. Details relating to the schedule and information to be provided in quality assurance reports. The reports should include but not be limited to:

   i) Periodic assessment of measurement data accuracy, precision, and completeness;

   ii) Results of performance audits;

   iii) Results of system audits;

   iv) Significant quality assurance problems and recommended solutions; and

   v) Resolutions of previously stated problems.

2. Sampling

The Sampling section of the Data Collection Quality Assurance Plan shall discuss:

a. Selecting appropriate sampling locations, depths, etc.;

b. Providing a statistically sufficient number of sampling sites;

c. Measuring all necessary ancillary data;

d. Determining conditions under which sampling should be conducted;

e. Determining which media are to be sampled (e.g., ground water, air, soil, sediment, etc.);

f. Determining which parameters are to be measured and where;

g. Selecting the frequency of sampling and length of sampling period;

h. Selecting the types of sample (e.g., composites vs. grabs) and number of samples to be collected;

i. Measures to be taken to prevent contamination if the sampling equipment and cross contamination between sampling points;

j. Documenting field sampling operations and procedures, including;

i) Documentation of procedures for preparation of reagents or supplies which become an integral part of the sample (e.g., filters, and adsorbing reagents);

ii) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;

iii) Documentation of specific sample preservation method;

iv) Calibration of field devices;

v) Collection of replicate samples;

vi) Submission of field-biased blanks, where appropriate;

vii) Potential interferences present at the facility;

viii) Construction materials and techniques, associated with monitoring wells and piezometers;

ix) Field equipment listing and sample containers;

x) Sampling order; and

xi) Decontamination procedures.

k. Selecting appropriate sample containers;

l. Sample preservation; and

m. Chain-of-custody, including:

i) Standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment; and

ii) Pre-prepared sample labels containing all information necessary for effective sample tracking.

3. Field Measurements

The Field Measurements section of the Data Collection Quality Assurance Plan shall discuss:

a. Selecting appropriate field measurement locations, depths, etc.;

b. Providing a statistically sufficient number of field measurements;

c. Measuring all necessary ancillary data;

d. Determining conditions under which field measurement should be conducted;

e. Determining which media are to be addresssed by appropriate field measurements (e.g., ground water, air, soil, sediment, etc.);

f. Determining which parameters are to be measured and where;

g. Selecting the frequency of field measurement and length of field measurements period; and

h. Documenting field measurement operations and procedures, including:

i) Procedures and forms for recording raw data and the exact location, time, and facility-specific considerations associated with the data acquisition;

ii) Calibration of field devices;

iii) Collection of replicate measurements;

iv) Submission of field-biased blanks, where appropriate;

v) Potential interferences present at the facility;

vi) Construction materials and techniques associated with monitoring wells and piezometers use to collect field data;

vii) Field equipment listing;

viii) Order in which field measurements were made; and

ix) Decontamination procedures.

4. **Sample Analysis**

The Sample Analysis section of the Data Collection Quality Assurance Plan shall specify the following:

a. Chain-of-custody procedures, including:

i) Identification of a responsible party to act as sample custodian at the laboratory facility authorized to sign for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;

ii) Provision for a laboratory sample custody log consisting of serially numbered standard lab-tracking report sheets; and

iii) Specification of laboratory sample custody procedures for sample handling, storage, and dispersement for analysis.

b. Sample storage procedures and storage times;

c. Sample preparation methods;

d. Analytical procedures, including:

i) Scope and application of the procedure;

ii) Sample matrix;

iii) Potential interferences;

iv) Precision and accuracy of the methodology; and

v) Method detection limits.

e. Calibration procedures and frequency;

f. Data reduction, validation and reporting;

g. Internal quality control checks, laboratory performance and systems audits and frequency, including:

i) Method blank(s);

ii) Laboratory control sample(s);

iii) Calibration check sample(s);

iv) Replicate sample(s);

v) Matrix-spiked sample(s);

vi) "Blind" quality control sample(s);

vii) Control charts;

viii) Surrogate samples;

ix) Zero and span gases; and

x) Reagent quality control checks.

[A performance audit will be conducted by U.S. EPA on the laboratories selected by the Owner/Operator [Respondent]. This audit must be completed and approved prior to the facility investigation.]

h. Preventive maintenance procedures and schedules;

i. Corrective action (for laboratory problems); and

j. Turnaround time.

C. Data Management Plan

The Owner/Operator [Respondent] shall develop and initiate a Data Management Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation.

1. Data Record

The data record shall include the following:

a. Unique sample or field measurement code;

b. Sampling or field measurement location and sample or measurement type;

c. Sampling or field measurement raw data;

d. Laboratory analysis ID number;

e. Property or component measured; and

f. Result of analysis (e.g., concentration).

2. Tabular Displays

The following data shall be presented in tabular displays:

a. Unsorted (raw) data;

b. Results for each medium, or for each constituent monitored;

c. Data reduction for statistical analysis;

d. Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and

e. Summary data.

3. Graphical Displays

The following data shall be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):

a. Display sampling location and sampling grid;

b. Indicate boundaries of sampling area, and areas where more data are required;

c. Displays levels of contamination at each sampling location;

d. Display geographical extent of contamination;

e. Display contamination levels, averages, and maxima;

f. Illustrate changes in concentration in relation to distance from the source, time, depth or other parameters; and

g. Indicate features affecting intramedia transport and show potential receptors.

D. Health and Safety Plan

The Owner/Operator [Respondent] shall prepare a facility Health and Safety Plan.

1. Major elements of the Health and Safety Plan shall include:

a. Facility description including availability of resources such as roads, water supply, electricity and telephone service;

b. Describe the known hazards and evaluate the risks associated with the incident and with each activity conducted;

c. List key personnel and alternates responsible for site safety, responses operations, and for protection of public health;

d. Delineate work area;

e. Describe levels of protection to be worn by personnel in work area;

f. Establish procedures to control site access;

g. Describe decontamination procedures for personnel and equipment;

h. Establish site emergency procedures;

i. Address emergency medical care for injuries and toxicological problems;

j. Describe requirements for an environmental surveillance program;

k. Specify any routine and special training required for responders; and

l. Establish procedures for protecting workers from weather-related problems.

2. The Facility Health and Safety Plan shall be consistent with:

a. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);

b. EPA Order 1440.1 - Respiratory Protection;

c. EPA Order 1440.3 - Health and Safety Requirements for Employees engaged in Field Activities;

d. Facility Contingency Plan;

e. EPA Standard Operating Safety Guide (1984);

f. OSHA regulations particularly in 29 CFR 1910 and 1926;

g. State and local regulations; and

h. Other EPA guidance as provided.

E. Community Relations Plan

The Owner/Operator [Respondent] shall prepare a plan, for the dissemination of information to the public regarding investigation activities and results.

TASK IV: FACILITY INVESTIGATION

The Owner/Operator [Respondent] shall conduct those investigations necessary to: characterize the facility (Environmental Setting); define the source (Source Characterization); define the degree and extent of contamination (Contamination Characterization); and identify actual or potential receptors.

The investigations should result in data of adequate technical quality to support the development and evaluation of the corrective measure alternative or alternatives during the Corrective Measures Study.

The site investigation activities shall follow the plans set forth in Task III. All sampling and analyses shall be conducted in accordance with the Data Collection Quality Assurance Plan. All sampling locations shall be documented in a log and identified on a detailed site map.

A. Environmental Setting

The Owner/Operator [Respondent] shall collect information to supplement and verify existing information on the environmental setting at the facility. The Owner/Operator [Respondent] shall characterize the following:

1. Hydrogeology

The Owner/Operator [Respondent] shall conduct a program to evaluate hydrogeologic conditions at the facility. This program shall provide the following information:

a. A description of the regional and facility specific geologic and hydrogeologic characteristics affecting ground-water flow beneath the facility, including:

i) Regional and facility specific stratigraphy: description of strata including strike and dip, identification of stratigraphic contacts;

ii) Structural geology: description of local and regional structural features (e.g., folding, faulting, tilting, jointing, etc.);

iii) Depositional history;

iv) Identification and characterization of areas and amounts of recharge and discharge.

v) Regional and facility specific ground-water flow patterns; and

vi) Characterize seasonal variations in the ground-water flow regime.

b. An analysis of any topographic features that might influence the ground-water flow system. (Note: Stereographic analysis of aerial photographs may aid in this analysis).

c. Based on field data, test, and cores, a representative and accurate classification and description of the hydrogeologic units which may be part of the migration pathways at the facility (i.e., the aquifers and any intervening saturated and unsaturated units), including:

   i) Hydraulic conductivity and porosity (total and effective);

   ii) Lithology, grain size, sorting, degree of cementation;

   iii) An interpretation of hydraulic interconnections between saturated zones; and

   iv) The attenuation capacity and mechanisms of the natural earth materials (e.g., ion exchange capacity, organic carbon content, mineral contect etc.).

d. Based on field studies and cores, structural geology and hydrogeologic cross sections showing the extent (depth, thickness, lateral extent) of hydrogeologic units which may be part of the migration pathways identifying:

   i) Sand and gravel deposits in unconsolidated deposits;

   ii) Zones of fracturing or channeling in consolidated or unconsolidated deposits;

   iii) Zones of higher permeability or low permeability that might direct and restrict the flow of contaminants;

   iv) The uppermost aquifer: geologic formation, group of formations, or part of a formation capable of yielding a significant amount of ground water to wells or springs; and

   v) Water-bearing zones above the first confining layer that may serve as a pathway for contaminant migration including perched zones of saturation.

e. Based on data obtained from ground-water monitoring wells and piezometers installed upgradient and downgradient of the potential contaminant source, a representative description of water level or fluid pressure monitoring including:

   i) Water-level contour and/or potentiometric maps;

   ii) Hydrologic cross sections showing vertical gradients;

iii) The flow system, including the vertical and horizontal components of flow; and

iv) Any temporal changes in hydraulic gradients, for example, due to tidal or seasonal influences.

f. A description of manmade influences that may affect the hydrogeology of the site, identifying:

i) Active and inactive local water-supply and production wells with an approximate schedule of pumping; and

ii) Manmade hydraulic structures (pipelines, french drains, ditches, unlined ponds, septic tanks, NPDES outfalls, retention areas, etc.).

2. Soils

The Owner/Operator [Respondent] shall conduct a program to characterize the soil and rock units above the water table in the vicinity of the contaminant release(s). Such characterization shall include but not be limited to, the following information:

a. SCS soil classification;
b. Surface soil distribution;
c. Soil profile, including ASTM classification of soils;
d. Transects of soil stratigraphy;
e. Hydraulic conductivity (saturated and unsaturated);
f. Relative permeability;
g. Bulk density;
h. Porosity;
i. Soil sorptive capacity;
j. Cation exchange capacity (CEC);
k. Soil organic content;
l. Soil pH;
m. Particle size distribution;
n. Depth of water table;
o. Moisture content;
p. Effect of stratification on unsaturated flow;
q. Infiltration
r. Evapotranspiration;
s. Storage capacity;
t. Vertical flow rate; and
u. Mineral content.

3. Surface Water and Sediment

The Owner/Operator [Respondent] shall conduct a program to characterize the surface - water bodies in the vicinity of the facility. Such characterization shall include, but not be limited to, the following activities and information:

a. Description of the temporal and permanent surface-water bodies including:

i) For lakes and estuaries: location, elevation, surface area, inflow, outflow, depth, temperature stratification, and volume;

ii) For impoundments: location, elevation, surface area, depth, volume, freeboard, and purpose of impoundment;

iii) For streams, ditches, drains, swamps and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations, and flooding tendencies (i.e., 100 year event);

iv) Drainage patterns; and

v) Evapotranspiration.

b. Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, biological oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients (NH_3, NO_3^-/NO_2^-, PO_4^{-3}), chemical oxygen demand, total organic carbon, specific contaminant concentrations, etc.

c. Description of sediment characteristics including:

i) Deposition area;

ii) Thickness profile; and

iii) Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, pH, etc.)

4. Air

The Owner/Operator [Respondent] shall provide information characterizing the climate in the vicinity of the facility. Such information shall include, but not be limited to:

a. A description of the following parameters:

i) Annual and monthly rainfall averages;

ii) Monthly temperature averages and extremes;

iii) Wind speed and direction;

iv) Relative humidity/dew point;

v) Atmospheric pressure;

vi) Evaporation data;

vii) Development of inversions; and

viii) Climate extremes that have been known to occur in the vicinity of the facility, including frequency of occurrence.

b. A description of topographic and manmade features which affect air flow and emission patterns, including:

i) Ridges, hills or mountain areas;

ii) Canyons or valleys;

iii) Surface water bodies (e.g. rivers, lakes, bays, etc.);

iv) Wind breaks and forests; and

v) Buildings.

B. Source Characterization

The Owner/Operator [Respondent] shall collect analytic data to completely characterize the wastes and the areas where wastes have been placed, collected or removed including: type; quantity; physical form; disposition (containment or nature of deposits); and facility characteristics affecting release (e.g., facility security, and engineered barriers). This shall include quantification of the following specific characteristics, at each source area:

1. Unit/Disposal Area characteristics:

a. Location of unit/disposal area;
b. Type of unit/disposal area;
c. Design features;
d. Operating practices (past and present);
e. Period of operation;
f. Age of unit/disposal area;
g. General physical conditions; and
h. Method used to close the unit/disposal area.

2. Waste Characteristics:

a. Type of waste placed in the unit;

i) Hazardous classification (e.g., flammable, reactive, corrosive, oxidizing or reducing agent);

ii) Quantity; and

iii) Chemical composition.

b. Physical and chemical characteristics;

i) Physical form (solid, liquid, gas);
ii) Physical description (e.g., powder, oily sludge);
iii) Temperature;
iv) pH;
v) General chemical class (e.g., acid, base, solvent);
vi) Molecular weight;
vii) Density;
viii) Boiling point;
ix) Viscosity;
x) Solubility in water;
xi) Cohesiveness of the waste;
xii) Vapor pressure.
xiii) Flash point

c. Migration and dispersal characteristics of the waste;

i) Sorption;

ii) Biodegradability, bioconcentration, biotransformation;

iii) Photodegradation rates;

iv) Hydrolysis rates; and

v) Chemical transformations.

The Owner/Operator [Respondent] shall document the procedures used in making the above determinations.

C. Contamination Characterization

The Owner/Operator [Respondent] shall collect analytical data on ground-water, soils, surface water, sediment, and subsurface gas contamination in the vicinity of the facility. This data shall be sufficient to define the extent, origin, direction, and rate of movement of contaminant plumes. Data shall include time and location of sampling, media sampled, concentrations found, and conditions during sampling, and the identity of the individuals performing the sampling and analysis. The Owner/Operator [Respondent] shall address the following types of contamination at the facility:

1. Ground-water Contamination

The Owner/Operator [Respondent] shall conduct a Ground-water Investigation to characterize any plumes of contamination at the facility. This investigation shall at a minimum provide the following information:

a. A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility;

b. The horizontal and vertical direction of contamination movement;

c. The velocity of contaminant movement;

d. The horizontal and vertical concentration profiles of Appendix VIII constituents in the plume(s);

e. An evaluation of factors influencing the plume movement; and

f. An extrapolation of future contaminant movement.

The Owner/Operator [Respondent] shall document the procedures used in making the above determinations (e.g., well design, well construction, geophysics, modeling, etc.).

2. Soil Contamination

The Owner/Operator [Respondent] shall conduct an investigation to characterize the contamination of the soil and rock units above the water table in the vicinity of the contaminant release. The investigation shall include the following information:

a. A description of the vertical and horizontal extent of contamination.

b. A description of contaminant and soil chemical properties within the contaminant source area and plume. This includes contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contaminant migration and transformation.

c. Specific contaminant concentrations.

d. The velocity and direction of contaminant movement.

e. An extrapolation of future contaminant movement.

The Owner/Operator [Respondent] shall document the procedures used in making the above determinations.

3. Surface-Water and Sediment Contamination

The Owner/Operator [Respondent] shall conduct a surface-water investigation to characterize contamination in surface-water bodies resulting from contaminant releases at the facility.

The investigation shall include, but not be limited to, the following information:

a. A description of the horizontal and vertical extent of any immisicible or dissolved plume(s) originating from the facility, and the extent of contamination in underlying sediments;

b. The horizontal and vertical direction of contaminant movement;

c. The contaminant velocity;

d. An evaluation of the physical, biological and chemical factors influencing contaminant movement;

e. An extrapolation of future contaminant movement; and

f. A description of the chemistry of the contaminated surface waters and sediments. This includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.;

The Owner/Operator [Respondent] shall document the procedures used in making the above determinations.

4. Air Contamination

The Owner/Operator [Respondent] shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere. This investigation shall provide the following information:

a. A description of the horizontal and vertical direction and velocity of contaminant movement;

b. The rate and amount of the release; and

c. The chemical and physical composition of the contaminants(s) released, including horizontal and vertical concentration profiles.

The Owner/Operator [Respondent] shall document the procedures used in making the above determinations.

5. Subsurface Gas Contamination

The Owner/Operator [Respondent] shall conduct an investigation to characterize subsurface gases emitted from buried hazardous waste and hazardous constituents in the ground water. This investigation shall include the following information:

a. A description of the horizontal and vertical extent of subsurface gases mitigation;

b. The chemical composition of the gases being emitted;

c. The rate, amount, and density of the gases being emitted; and

d. Horizontal and vertical concentration profiles of the subsurface gases emitted.

The Owner/Operator [Respondent] shall document the procedures used in making the above determinations.

D. Potential Receptors

The Owner/Operator [Respondent] shall collect data describing the human populations and environmental systems that are susceptible to contaminant exposure from the facility. Chemical analysis of biological samples may be needed. Data on observable effects in ecosystems may also be obtained. The following characteristics shall be identified:

1. Local uses and possible future uses of ground water:

   a. Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable, and industrial); and

   b. Location of groundwater users including wells and discharge areas.

2. Local uses and possible future uses of surface waters draining the facility:

   a. Domestic and municipal (e.g. potable and lawn/gardening watering);
   b. Recreational (e.g. swimming, fishing);
   c. Agricultural;
   d. Industrial; and
   e. Environmental (e.g. fish and wildlife propagation).

3. Human use of or access to the facility and adjacent lands, including but not limited to:
   a. Recreation;
   b. Hunting;
   c. Residential;
   d. Commercial;
   e. Zoning; and
   f. Relationship between population locations and prevailing wind direction.

4. A description of the biota in surface water bodies on, adjacent to, or affected by the facility.

5. A description of the ecology overlying and adjacent to the facility.

6. A demographic profile of the people who use or have access to the facility and adjacent land, including, but not limited to: age; sex; and sensitive subgroups.

7. A description of any endangered or threatened species near the facility.

TASK V: INVESTIGATION ANALYSIS

The Owner/Operator [Respondent] shall prepare an analysis and summary of all facility investigations and their results. The objective of this task shall be to ensure that the investigation data are sufficient in quality (e.g., quality assurance procedures have been followed) and quantity to describe the nature and extent of contamination, potential threat to human health and/or the environment, and to support the Corrective Measures Study.

A. Data Analysis

The Owner/Operator [Respondent] shall analyze all facility investigation data outlined in Task IV and prepare a report on the type and extent of contamination at the facility including sources and migration pathways. The report shall describe the extent of contamination (qualitative/quantitative) in relation to background levels indicative for the area.

B. Protection Standards [where applicable]

1. Ground-water Protection Standards

For regulated units the Owner/Operator [Respondent] shall provide information to support the Agency's selection/development of Ground-water Protection Standards for all of the Appendix VIII constituents found in the ground-water during the Facility Investigation (Task IV).

a. The Groundwater Protection Standards shall consist of:

i) for any constituents listed in Table 1 of 40 CFR 264.94, the respective value given in that table (MCL) if the background level of the constituent is below the given in Table 1; or

ii) the background level of that constituent in the ground-water; or

iii) a U.S. EPA approved Alternate Concentration Limit (ACL).

b. Information to support the Agency's subsequent selection of Alternate Concentration Limits (ACL's) shall be developed by the Owner/Operator [Respondent] in accordance with U.S. EPA guidance. For any proposed ACL's the Owner/Operator [Respondent] shall include a justification based upon the criteria set forth in 40 CFR 264.94(b).

c. Within [insert number] days of receipt of any proposed ACL's. The U.S. EPA shall notify the Owner/Operator [Respondent] in writing of approval, disapproval or modifications, the U.S. EPA shall specify in writing the reason(s) for any disapproval or modification.

d. Within [insert number] days of receipt of the U.S. EPA's notification or disapproval of any proposed ACL, the Owner/Operator [Respondent] shall amend and submit revisions to the U.S. EPA.

2. Other Relevant Protection Standards

The Owner/Operator [Respondent] shall identify all relevant and applicable standards for the protection of human health and the environment (e.g. National Ambient Air Quality Standards, Federally-approved state water quality standards, etc.).

TASK VI: LABORATORY AND BENCH-SCALE STUDIES

The Owner/Operator [Respondent] shall conduct laboratory and/or bench scale studies to determine the applicability of a corrective measure technology or technologies to facility conditions. The Owner/Operator [Respondent] shall analyze the technologies, based on literature review, vendor contracts, and past experience to determine the testing requirements.

The Owner/Operator [Respondent] shall develop a testing plan identifying the types(s) and goal(s) of the study(ies), the level of effort needed, and the procedures to be used for data management and interpretation.

Upon completion of the testing, the Owner/Operator [Respondent] shall evaluate the testing results to assess the technology or technologies with respect to the site-specific questions identified in the test plan.

The Owner/Operator [Respondent] shall prepare a report summarizing the testing program and its results, both positive and negative.

TASK VII: REPORTS

A. Preliminary and Workplan

The Owner/Operator [Respondent] shall submit to the EPA reports on Tasks I and II when it submits the RCRA Facility Investigation Workplan (Task III).

B. Progress

The Owner/Operator [Respondent] shall at a minimum provide the EPA with signed, [monthly, bimonthly] progress reports containing:

1. A description and estimate of the percentage of the RFI completed;

2. Summaries of all findings;

3. Summaries of all changes made in the RFI during the reporting period;

4. Summaries of all contacts with representative of the local community, public interest groups or State government during the reporting period;

5. Summaries of all problems or potential problems encountered during the reporting period;

6. Actions being taken to rectify problems;

7. Changes in personnel during the reporting period;

8. Projected work for the next reporting period; and

9. Copies of daily reports, inspection reports, laboratory/ monitoring data, etc.

C. Draft and Final

Upon EPA approval, the Owner/Operator [Respondent] shall prepare a RCRA Facility Investigation Report to present Tasks IV-V. The RCRA Facility investigation Report shall be developed in draft form for U.S. EPA review. The RCRA Facility Investigation Report shall be developed in final format incorporating comments received on the Draft RCRA Facility Investigation Report. Task VI shall be submitted as a separate report when the Final RCRA Facility Investigation Report is submitted.

[number] copies of all reports, including the Task I report, Task II report, Task III workplan, Task VI report and both the Draft and Final RCRA Facility Investigation Reports (Task IV-V) shall be provided by the Owner/Operator [Respondent] to U.S. EPA.

[THE FOLLOWING FACILITY SUBMISSION SUMMARY MAY BE PLACED IN THE BODY OF THE ORDER OR PERMIT AND REMOVED FROM THE SCOPE OF WORK. NOT ALL OF THE ITEMS LISTED BELOW MAY BE REQUIRED AT EACH FACILITY.]

Facility Submission Summary

A summary of the information reporting requirements contained in the RCRA Facility Investigation Scope of Work is presented below:

Facility Submission	Due Date
Description of Current Situation (Task I)	[DATE]
Pre-Investigation Evaluation of Corrective Measure Technologies (Task II)	[DATE]
RFI Workplan (Task III)	[DATE]
Draft RFI Report (Tasks IV and V)	[NUMBER] days after RFI Workplan Approval
Final RFI Report (Tasks IV and V)	[NUMBER] days after EPA comment on Draft RFI Report
Laboratory and Bench-Scale Studies (Task VI)	Concurrent with Final RFI Report
Progress Reports on Tasks I through VI	[MONTHLY, BI-MONTHLY]

CMS

SCOPE OF WORK FOR A CORRECTIVE MEASURE STUDY AT [SPECIFY FACILITY NAME]

PURPOSE

The purpose of this Corrective Measure Study (CMS) is to develop and evaluate the corrective action alternative or alternatives and to recommend the corrective measure or measures to be taken at [specify facility name]. The Owner/Operator [Respondent] will furnish the personnel, materials, and services necessary to prepare the corrective measure study, except as otherwise specified.

[Note: This scope of work is intended to foster timely, concise submissions by Owner/Operators. To achieve this goal, it is important when using the model scope of work to consider facility specific conditions. This scope should be modified as necessary to require only that information necessary to complete the Corrective Measure Study.]

SCOPE

The Corrective Measure Study consists of four tasks:

Task VIII: Identification and Development of the Corrective Measure Alternative or Alternatives

- A. Description of Current Situation
- B. Establishment of Corrective Action Objectives
- C. Screening of Corrective Measures Technologies
- D. Identification of the Corrective Measure Alternative or Alternatives

Task IX: Evaluation of the Corrective Measure Alternative or Alternatives

- A. Technical/Environmental/Human Health/Institutional
- B. Cost Estimate

Task X: Justification and Recommendation of the Corrective Measure or Measures

- A. Technical
- B. Environmental
- C. Human Health

Task XI: Reports

- A. Progress
- B. Draft
- C. Final

TASK VIII: IDENTIFICATION AND DEVELOPMENT OF THE CORRECTIVE ACTION ALTERNATIVE OR ALTERNATIVES

Based on the results of the RCRA Facility Investigation and consideration of the identified Preliminary Corrective Measure Technologies (Task II), the Owner/Operator [Respondent] shall identify, screen and develop the alternative or alternatives for removal, containment, treatment and/or other remediation of the contamination based on the objectives established for the corrective action.

A. Description of Current Situation

The Owner/Operator [Respondent] shall submit an update to the information describing the current situation at the facility and the known nature and extent of the contamination as documented by the RCRA Facility Investigation Report. The Owner/Operator [Respondent] shall provide an update to information presented in Task I of the RFI to the Agency regarding previous response activities and any interim measures which have or are being implemented at the facility. The Owner/Operator [Respondent] shall also make a facility-specific statement of the purpose for the response, based on the results of the RCRA Facility Investigation. The statement of purpose should identify the actual or potential exposure pathways that should be addressed by corrective measures.

B. Establishment of Corrective Action Objectives

The Owner/Operator [Respondent], in conjunction with the U.S. EPA, shall establish site specific objectives for the corrective action. These objectives shall be based on public health and environmental criteria, information gathered during the RCRA Facility Investigation, EPA guidance, and the requirements of any applicable Federal statutes. At a minimum, all corrective actions concerning ground water releases from regulated units must be consistent with, and as stringent as, those required under 40 CFR 264.100.

C. Screening of Corrective Measure Technologies

The Owner/Operator [Respondent] shall review the results of the RCRA Facility Investigation and reassess the technologies specified in Task II and to identify additional technologies which are applicable at the facility. The Owner/Operator [Respondent] shall screen the preliminary corrective measure technologies identified in Task II of the RCRA Facility investigation and any supplemental technologies to eliminate those that may prove infeasible to implement, that rely on technologies unlikely to perform satisfactorily or reliably, or that do not achieve the corrective measure objective within a reasonable time period. This screening process focuses on eliminating those technologies which have severe limitations for a given set of waste and site-specific conditions. The screening step may also eliminate technologies based on inherent technology limitations.

Site, waste, and technology characteristics which are used to screen inapplicable technologies are described in more detail below:

1. Site Characteristics

   Site data should be reviewed to identify conditions that may limit or promote the use of certain technologies. Technologies whose use is clearly precluded by site characteristics should be eliminated from further consideration;

2. Waste Characteristics

   Identification of waste characteristics that limit the effectiveness or feasibility of technologies is an important part of the screening process. Technologies clearly limited by these waste characteristics should be eliminated from consideration. Waste characteristics particularly affect the feasibility of in-situ methods, direct treatment methods, and land disposal (on/off-site); and

3. Technology Limitations

   During the screening process, the level of technology development, performance record, and inherent construction, operation, and maintenance problems should be identified for each technology considered. Technologies that are unreliable, perform poorly, or are not fully demonstrated may be eliminated in the screening process. For example, certain treatment methods have been developed to a point where they can be implemented in the field without extensive technology transfer or development.

D. Identification of the Corrective Measure Alternative or Alternatives

The Owner/Operator [Respondent] shall develop the Corrective measure alternative or alternatives based on the corrective action objectives and analysis of Preliminary Corrective Measure Technologies, as presented in Task II of the RCRA Facility investigation and as supplemented following the preparation of the RFI Report. The Owner/Operator [Respondent] shall rely on engineering practice to determine which of the previously identified technologies appear most suitable for the site. Technologies can be combined to form the overall corrective action alternative or alternatives. The alternative or alternatives developed should represent a workable number of option(s) that each appear to adequately address all site problems and corrective action objectives. Each alternative may consist of an individual technology or a combination of technologies. The Owner/Operator [Respondent] shall document the reasons for excluding technologies, identified in Task II, as supplemented in the development of the alternative or alternatives.

TASK IX: EVALUATION OF THE CORRECTIVE MEASURE ALTERNATIVE OR ALTERNATIVES

The Owner/Operator [Respondent] shall describe each corrective measure alternative that passes through the Initial Screening in Task VIII and evaluate each corrective measure alternative and it's components. The evaluation shall be based on technical, environmental, human health and institutional concerns. The Owner/Operator [Respondent] shall also develop cost estimates of each corrective measure.

A. Technical/Environmental/Human Health/Institutional

The [Owner/ Operator] Respondent shall provide a description of each corrective measure alternative which includes but is not limited to the following: preliminary process flow sheets; preliminary sizing and type of construction for buildings and structures; and rough quantities of utilities required. The Owner/Operator [Respondent] shall evaluate each alternative in the four following areas:

1. Technical;

The Owner/Operator [Respondent] shall evaluate each corrective measure alternative based on performance, reliability, implementability and safety.

a. The Owner/Operator [Respondent] shall evaluate performance based on the effectiveness an useful life of the corrective measure:

i) Effectiveness shall be evaluated in terms of the ability to perform intended functions, such as containment, diversion, removal, destruction, or treatment. The effectiveness of each corrective measure shall be determined either through design specifications or by performance evaluation. Any specific waste or site characteristics which could potentially impede effectiveness shall be considered. The evaluation should also consider the effectiveness of combinations of technologies; and

ii) Useful life is defined as the length of time the level of effectiveness can be maintained. Most corrective measure technologies, with the exception of destruction, deteriorate with time. Often, deterioration can be slowed through proper system operation and maintenance, but the technology eventually may require replacement. Each corrective measure shall be evaluated in terms of the projected service lives of its component technologies. Resource availability in the future life of the technology, as well as appropriateness of the technologies, must be considered in estimating the useful life of the project.

b. The Owner/Operator [Respondent] shall provide information on the reliability of each corrective measure including their operation and maintenance requirements and their demonstrated reliability:

i) Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance. Technologies requiring frequent or complex operation and maintenance activities should be regarded as less reliable than technologies requiring little or straightforward operation and maintenance. The availability of labor and materials to meet these requirements shall also be considered; and

ii) Demonstrated and expected reliability is a way of measuring the risk and effect of failure. The Owner/Operator [Respondent] should evaluate whether the technologies have been used effectively under analogous conditions; whether the combination of technologies have been used together effectively; whether failure of any one technology has an immediate impact on receptors; and whether the corrective measure has the flexibility to deal with uncontrollable changes at the site.

c. The Owner/Operator [Respondent] shall describe the implementability of each corrective measure including the relative ease of installation (constructability) and the time required to achieve a given level of response:

i) Constructability is determined by conditions both internal and external to the facility conditions and include such items as location of underground utilities, depth to water table, heterogeneity of subsurface materials, and location of the facility (i.e., remote location vs. a congested urban area). The Owner/Operator [Respondent] shall evaluate what measures can be taken to facilitate construction under these conditions. External factors which affect implementation include the need for special permits or agreements, equipment availability, and the location of suitable off-site treatment or disposal facilities; and

ii) Time has two components that shall be addressed: the time it takes to implement a corrective measure and the time it takes to actually see beneficial results. Beneficial results are defined as the reduction of contaminants to some acceptable, pre-established level.

d. The Owner/Operator [Respondent] shall evaluate each corrective measure alternative with regard to safety. This evaluation shall include threats to the safety of nearby communities and environments as well as those to workers during implementation. Factors to consider are fire, explosion, and exposure to hazardous substances.

2. Environmental;

The Owner/Operator [Respondent] shall perform an Environmental Assessment for each alternative. The Environmental Assessment shall focus on the facility conditions and pathways of contamination actually addressed by each alternative. The Environmental Assessment for each alternative will include, at a minimum, an evaluation of: the short- and long-term beneficial and adverse effects of the response alternative; any adverse effects on environmentally sensitive areas; and an analysis of measures to mitigate adverse effects.

3. Human Health; and

The Owner/Operator [Respondent] shall assess each alternative in terms of the extent of which it mitigates short- and long-term potential exposure to any residual contamination and protects human health both during and after implementation the corrective measure. The assessment will describe the levels and characterizations of contaminants on-site, potential exposure routes, and potentially affected population. Each alternative will be evaluated to determine the level of exposure to contaminants and the reduction over time. For management of mitigation measures, the relative reduction of impact will be determined by comparing residual levels of each alternative with existing criteria, standards, or guidelines acceptable to EPA.

4. Institutional.

The Owner/Operator [Respondent] shall assess relevant institutional needs for each alternative. Specifically, the effects of Federal, state and local environmental and public health standards, regulations, guidance, advisories, ordinances, or community relations on the design, operation, and timing of each alternative.

B. Cost Estimate

The Owner/Operator [Respondent] shall develop an estimate of the cost of each corrective measure alternative (and for each phase or segment of the alternative). The cost estimate shall include both capital and operation and maintenance costs.

1. Capital costs consist of direct (construction) and indirect (nonconstruction and overhead) costs.

   a. Direct capital costs include:

      i) Construction costs: Costs of materials, labor (including fringe benefits and worker's compensation), and equipment required to install the corrective measure.

      ii) Equipment costs: Costs of treatment, containment, disposal and/or service equipment necessary to implement the action; these materials remain until the corrective action is complete;

      iii) Land and site-development costs: Expenses associated with purchase of land and development of existing property; and

      iv) Buildings and services costs: Costs of process and nonprocess buildings, utility connections, purchased services, and disposal costs.

   b. Indirect capital costs include:

      i) Engineering expenses: Costs of administration, design, construction supervision, drafting, and testing of corrective measure alternatives;

      ii) Legal fees and license or permit costs: Administrative and technical costs necessary to obtain licenses and permits for installation and operation;

      iii) Startup and shakedown costs: Costs incurred during corrective measure startup; and

      iv) Contingency allowances: Funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, and inadequate facility characterization.

2. Operation and maintenance costs are post-construction costs necessary to ensure continued effectiveness of a corrective measure. The Owner/Operator [Respondent] shall consider the following operation and maintenance cost components:

a. Operating labor costs: Wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operations;

b. Maintenance materials and labor costs: Costs for labor, parts, and other resources required for routine maintenance of facilities and equipment;

c. Auxillary materials and energy: Costs of such items as chemicals and electricity for treatment plant operations, water and sewer service, and fuel;

d. Purchased services: Sampling costs, laboratory fees, and professional fees for which the need can be predicted;

e. Disposal and treatment costs: Costs of transporting, treating, and disposing of waste materials, such as treatment plant residues, generated during operations;

f. Administrative costs: Costs associated with administration of corrective measure operation and maintenance not included under other categories;

g. Insurance, taxes, and licensing costs: Costs of such items as liability and sudden accidental insurance; real estate taxes on purchased land or rights-of-way; licensing fees for certain technologies; and permit renewal and reporting costs;

h. Maintenance reserve and contingency funds: Annual payments into escrow funds to cover (1) costs of anticipated replacement or rebuilding of equipment and (2) any large unanticipated operation and maintenance costs; and

i. Other costs: Items that do not fit any of the above categories.

TASK X: JUSTIFICATION AND RECOMMENDATION OF THE CORRECTIVE MEASURE OR MEASURES

The Owner/Operator [Respondent] shall justify and recommend a corrective measure alternative using technical, human health, and environmental criteria. This recommendation shall include summary tables which allow the alternative or alternatives to be understood easily. Tradeoffs among health risks, environmental effects, and other pertinent factors shall be highlighted. The U.S. EPA will select the corrective measure alternative or alternatives to be implemented based on the results of Tasks IX and X. At a minimum, the following criteria will be used to justify the final corrective measure or measures.

A. Technical

1. Performance - corrective measure or measures which are most effective at performing their intended functions and maintaining the performance over extended periods of time will be given preference;

2. Reliability - corrective measure or measures which do not require frequent or complex operation and maintenance activities and that have proven effective under waste and facility conditions similar to those anticipated will be given preference;

3. Implementability - corrective measure or measures which can be constructed and operating to reduce levels of contamination to attain or exceed applicable standards in the shortest period of time will be preferred; and

4. Safety - corrective measure or measures which pose the least threat to the safety of nearby residents and environments as well as workers during implementation will be preferred.

B. Human Health

The corrective measure or measures must comply with existing U.S. EPA criteria, standards, or guidelines for the protection of human health. Corrective measures which provide the minimum level of exposure to contaminants and the maximum reduction in exposure with time are preferred.

C. Environmental

The corrective measure or measures posing the least adverse impact (or greatest improvement) over the shortest period of time on the environment will be favored.

TASK XI: REPORTS

The Owner/Operator [Respondent] shall prepare a Corrective Measure Study Report presenting the results of Task VIII through X and recommending a corrective measure alternative. [number] copies of the preliminary report shall be provided by the Owner/Operator [Respondent].

A. Progress

The Owner/Operator [Respondent] shall at a minimum provide the EPA with signed, [monthly, bimonthly] progress reports containing:

1. A description and estimate of the percentage of the CMS completed;
2. Summaries of all findings;
3. Summaries of all changes made in the CMS during the reporting period;
4. Summaries of all contacts with representative of the local community, public interest groups or State government during the reporting period;
5. Summaries of all problems or potential problems encountered during the reporting period;
6. Actions being taken to rectify problems;
7. Changes in personnel during reporting period;
8. Projected work for the next reporting period; and
9. Copies of daily reports, inspection reports, laboratory/ monitoring data, etc.

B. Draft

The Report shall at a minimum include:

1. A description of the facility;
   a. Site topographic map & preliminary layouts.
2. A summary of the corrective measure or measures;
   a. Description of the corrective measure or measures and rationale for selection;
   b. Performance expectations;
   c. Preliminary design criteria and rationale;
   d. General operation and maintenance requirements; and
   e. Long-term monitoring requirements.

3. A summary of the RCRA Facility Investigation and impact on the selected corrective measure or measures;

   a. Field studies (ground-water, surface water, soil, air); and

   b. Laboratory studies (bench scale, pick scale).

4. Design and Implementation Precautions;

   a. Special technical problems;

   b. Additional engineering data required;

   c. Permits and regulatory requirements;

   d. Access, easements, right-of-way;

   e. Health and safety requirements; and

   f. Community relations activities.

5. Cost Estimates and Schedules;

   a. Capital cost estimate;

   b. Operation and maintenance cost estimate; and

   c. Project schedule (design, construction, operation).

[number] copies of the draft shall be provided by the Owner/Operator [Respondent] to U.S. EPA.

C. Final

The Owner/Operator [Respondent] shall finalize the Corrective Measure Study Report incorporating comments received from EPA on the Draft Corrective Measure Study Report.

[THE FOLLOWING FACILITY SUBMISSION SUMMARY MAY BE PLACED IN THE BODY OF THE ORDER OR PERMIT AND REMOVED FROM THE SCOPE OF WORK. NOT ALL OF THE ITEMS LISTED BELOW MAY BE REQUIRED AT EACH FACILITY.]

Facility Submission Summary

A summary of the information reporting requirements contained in the Corrective Measure Study Scope of Work is presented below:

Facility Submission	Due Date
Draft CMS Report (Tasks VIII, IX, and X)	[NUMBER] days after submittal of the Final RFI
Final CMS Report (Tasks VIII, IX, and X)	[NUMBER] days after Public and EPA comment on the Draft CMS
Progress Reports on Tasks VIII, IX, and X	[MONTHLY, BI-MONTHLY]

SCOPE OF WORK FOR THE CORRECTIVE MEASURE IMPLEMENTATION AT [SPECIFY FACILITY NAME]

PURPOSE

The purpose of this Corrective Measure Implementation (CMI) program is to design, construct, operate, maintain, and monitor the performance of the corrective measure or measures selected to protect human health and the environment. The Owner/Operator [Respondent] will furnish all personnel, materials and services necessary for the implementation of the corrective measure or measures.

[Note: This scope of work is intended to foster timely, concise submissions by Owner/Operators. To achieve this goal, it is important when using the model scope of work to consider facility specific conditions. This scope should be modified as necessary to require only that information necessary to complete the Corrective Measure Implementation.]

SCOPE

The Corrective Measure Implementation program consists of four tasks;

Task XII: Corrective Measure Implementation Program Plan

- A. Program Management Plan
- B. Community Relations Plan

Task XIII: Corrective Measure Design

- A. Design Plans and Specifications
- B. Operation and Maintenance Plan
- C. Cost Estimate
- D. Project Schedule
- E. Construction Quality Assurance Objectives
- F. Health and Safety Plan
- G. Design Phases

Task XIV: Corrective Measure Construction

- A. Responsibility and Authority
- B. Construction Quality Assurance Personnel Qualifications
- C. Inspection Activities
- D. Sampling Requirements
- E. Documentation

Task XV: Reports

- A. Progress
- B. Draft
- C. Final

TASK XII: CORRECTIVE MEASURE IMPLEMENTATION PROGRAM PLAN

The Owner/Operator [Respondent] shall prepare a Corrective Measure Implementation Program Plan. This program will include the development and implementation of several plans, which require concurrent preparation. It may be necessary to revise plans as the work is performed to focus efforts on a particular problem. The Program Plan includes the following:

A. Program Management Plan

The Owner/Operator [Respondent] shall prepare a Program Management Plan which will document the overall management strategy for performing the design, construction, operation, maintenance and monitoring of corrective measure(s). The plan shall document the responsibility and authority of all organizations and key personnel involved with the implementation. The Program Management Plan will also include a description of qualifications of key personnel directing the Corrective Measure Implementation Program, including contractor personnel.

B. Community Relations Plan

The Owner/Operator [Respondent] shall revise the Community Relations Plan to include any changes in the level of concern of information needs to the community during design and construction activities.

1. Specific activities which must be conducted during the design stage are the following:

   a. Revise the facility Community Relations Plan to reflect knowledge of citizen concerns and involvement at this stage of the process; and

   b. Prepare and distribute a public notice and an updated fact sheet at the completion of engineering design.

2. Specific activities to be conducted during the construction stage could be the following: Depending on citizen interest at a facility at this point in the corrective action process, community relations activities could range from group meetings to fact sheets on the technical status.

TASK XIII: CORRECTIVE MEASURE DESIGN

The Owner/Operator [Respondent] shall prepare final construction plans and specifications to implement the corrective measure(s) at the facility as defined in the Corrective Measure Study.

A. Design Plans and Specifications

The Owner/Operator [Respondent] shall develop clear and comprehensive design plans and specifications which include but are not limited to the following:

1. Discussion of the design strategy and the design basis, including;

   a. Compliance with all applicable or relevant environmental and public health standards; and

   b. Minimization of environmental and public impacts.

2. Discussion of the technical factors of importance including:

   a. Use of currently accepted environmental control measures and technology;

   b. The constructability of the design; and

   c. Use of currently acceptable construction practices and techniques.

3. Description of assumptions made and detailed justification of these assumptions;

4. Discussion of the possible sources of error and references to possible operation and maintenance problems;

5. Detailed drawings of the proposed design including;

   a. Qualitative flow sheets; and

   b. Quantitative flow sheets.

6. Tables listing equipment and specifications;

7. Tables giving material and energy balances;

8. Appendices including;

   a. Sample calculations (one example presented and explained clearly for significant or unique design calculations);

   b. Derivation of equations essential to understanding the report; and

   c. Results of laboratory or field tests.

B. Operation and Maintenance Plan

The Owner/Operator [Respondent] shall prepare an Operation and Maintenance Plan to cover both implementation and long term maintenance of the corrective measure. The plan shall be composed of the following elements:

1. Description of normal operation and maintenance (O&M);

   a. Description of tasks for operation;

   b. Description of tasks for maintenance;

   c. Description of prescribed treatment or operation conditions; and

   d. Schedule showing frequency of each O&M task.

2. Description of potential operating problems;

   a. Description and analysis of potential operation problems;

   b. Sources of information regarding problems; and

   c. Common and/or anticipated remedies.

3. Description of routine monitoring and laboratory testing;

   a. Description of monitoring tasks;

   b. Description of required laboratory tests and their interpretation;

   c. Required QA/QC; and

   d. Schedule of monitoring frequency and date, if appropriate, when monitoring may cease.

4. Description of alternate O&M;

   a. Should systems fail, alternate procedures to prevent undue hazard; and

   b. Analysis of vulnerability and additional resource requirements should a failure occur.

5. Safety plan;

   a. Description of precautions, of necessary equipment, etc., for site personnel; and

   b. Safety tasks required in event of systems failure.

6. Description of equipment; and

   a. Equipment identification;

   b. Installation of monitoring components;

   c. Maintenance of site equipment; and

   d. Replacement schedule for equipment and installed components.

7. Records and reporting mechanisms required.

   a. Daily operating logs;

   b. Laboratory records;

   c. Records for operating costs;

   d. Mechanism for reporting emergencies;

   e. Personnel and maintenance records; and

   f. Monthly/annual reports to State agencies.

An initial Draft Operation and Maintenance Plan shall be submitted simultaneously with the Prefinal Design Document submission and the Final Operation and Maintenance Plan with the Final Design Documents.

C. Cost Estimate

The Owner/Operator [Respondent] shall develop cost estimates for the purpose of assuring that the facility has the financial resources necessary to construct and implement the corrective measure. The cost estimate developed in the Corrective Measure Study shall be refined to reflect the more detailed/accurate design plans and specifications being developed. The cost estimate shall include both capital and operation and maintenance costs. An Initial Cost Estimate shall be submitted simultaneously with the Prefinal Design submission and the Final Cost Estimate with the Final Design Document.

D. Project Schedule

The Owner/Operator [Respondent] shall develop a Project Schedule for construction and implementation of the corrective measure or measures which identifies timing for initiation and completion of all critical path tasks. Owner/Operator [Respondent] shall specifically identify dates for completion of the project and major interim milestones. An Initial Project Schedule shall be submitted simultaneously with the Prefinal Design Document submission and the Final Project Schedule with the Final Design Document.

E. Construction Quality Assurance Objectives

The Owner/Operator [Respondent] shall identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to the following: responsibility and authority; personnel qualifications; inspection activities; sampling requirements; and documentation.

F. Health and Safety Plan

The Owner/Operator [Respondent] shall modify the Health Safety Plan developed for the RCRA Facility Investigation to address the activities to be performed at the facility to implement the corrective measure(s).

G. Design Phases

The design of the corrective measure(s) should include the phases outlined below.

1. Preliminary design

The Owner/Operator [Respondent] shall submit the Preliminary design when the design effort is approximately 30% complete. At this stage the Owner/Operator [Respondent] shall have field verified the existing conditions of the facility. The preliminary design shall reflect a level of effort such that the technical requirements of the project have been addressed and outlined so that they may be reviewed to determine if the final design will provide an operable and usable corrective measure. Supporting data and documentation shall be provided with the design documents defining the functional aspects of the program. The preliminary construction drawings by the Owner/Operator [Respondent] shall reflect organization and clarity. The scope of the technical specifications shall be outlined in a manner reflecting the final specifications. The Owner/Operator [Respondent] shall include with the preliminary submission design calculations reflecting the same percentage of completion as the designs they support.

2. Intermediate design

Complex project design may necessitate review of the design documents between the preliminary and the prefinal/final design. At the discretion of the Agency, a design review may be required at 60% completion of the project. The intermediate design submittal should include the same elements as the prefinal design.

3. Correlating plans and specifications

General correlation between drawings and technical specifications, is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications, the Owner/Operator [Respondent] shall:

a. Coordinate and cross-check the specifications and drawings; and

b. Complete the proofing of the edited specifications and required cross-checking of all drawings and specifications.

These activities shall be completed prior to the 95% prefinal submittal to the Agency.

4. Equipment start-up and operator training

The Owner/Operator [Respondent] shall prepare, and include in the technical specifications governing treatment systems, contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, adjustment, startup and operation of the treatment systems, and training covering appropriate operational procedures once the startup has been successfully accomplished.

5. Additional studies

Corrective Measure Implementation may require additional studies to supplement the available technical data. At the direction of the Agency for any such studies required, the Owner/Operator [Respondent] shall furnish all services, including field work as required, materials, supplies, plant, labor, equipment, investigations, studies and superintendence. Sufficient sampling, testing and analysis shall be performed to optimize the required treatment and/or disposal operations and systems. There shall be an initial meeting of all principal personnel involved in the development of the program. The purpose will be to discuss objectives, resources, communication channels, role of personnel involved and orientation of the site, etc. The interim report shall present the results of the testing with the recommended treatment or disposal system (including options). A review conference shall be scheduled after the interim report has been reviewed by all interested parties. The final report of the testing shall include all data taken during the testing and a summary of the results of the studies.

6. Prefinal and final design

The Owner/Operator [Respondent] shall submit the prefinal/Final design documents in two parts. The first submission shall be at 95% completion of design (i.e., prefinal). After approval of the prefinal submission, the Owner/Operator [Respondent] shall execute the required revisions and submit the final documents 100% complete with reproducible drawings and specifications.

The prefinal design submittal and shall consist of the Design Plans and Specifications, Operation and Maintenance Plan, Capital and Operating and Maintenance Cost Estimate, Project Schedule, Quality Assurance Plan and Specifications for the Health and Safety Plan.

The final design submittal consist of the Final Design Plans and Specifications (100% complete), the Owner/Operator's [Respondent's] Final Construction Cost Estimate, the Final Operation and Maintenance Plan, Final Quality Assurance Plan, Final Project Schedule and Final Health and Safety Plan specifications. The quality of the design documents should be such that the Owner/Operator [Respondent] would be able to include them in a bid package and invite contractors to submit bids for the construction project.

TASK XIV: CORRECTIVE MEASURE CONSTRUCTION

Following EPA approval of the final design, the Owner/Operator [Respondent] shall develop and implement a construction quality assurance (CQA) program to ensure, with a reasonable degree of certainty, that a completed corrective measure(s) meets or exceeds all design criteria, plans and specifications. The CQA plan is a facilityspecific document which must be submitted to the Agency for approval prior to the start of construction. At a minimum, the CQA plan should include the elements, which are summarized below. Upon EPA approval of the CQA plan the Owner/Operator [Resondent] shall construct and implement the corrective measures in accordance with the approved design, schedule and the CQA plan. The Owner/Operator [Respondent] shall also implement the elements of the approved Operation and Maintenance plan.

A. Responsibility and Authority

The resporsibility and authoritv of all organizations (i.e. technical consultants, construction firms, etc.) and key personnel involved in the construction of the corrective measure shall be described fully in the COA plan. The Owner/Operator [Respondent] must identify a COA officer and the necessary supporting inspection staff.

B. Construction Quality Assurance Personnel Qualifications

The qualifications of the CQA officer and supporting inspection personnel shall be presented in the CQA plan to demonstrate that they possess the training and experience necessay to fulfill their identified responsibilities.

C. Inspection Activities

The observations and tests that will be used to monitor the construction and/or installation of the components of the corrective measure(s) shall be summarized in the CQA plan. The plan shall include the scope and frequency of each type of inspection. Inspections shall verify compliance with all environmental requirements and include, but not be limited to air quality and emissions monitoring records, waste disposal records (e.g., RCRA transportation manifests), etc. The inspection should also ensure compliance with all health and safety procedures. In addition to oversight inspections, the Owner/Operator [Respondent] shall conduct the following activities:

1. Preconstruction inspection and meeting

The Owner/Operator [Respondent] shall conduct a preconstruction inspection and meeting to:

a. Review methods for documenting and reporting inspection data;

b. Review methods for distributing and storing documents and reports;

c. Review work area security and safety protocol;

d. Discuss any appropriate modifications of the construction quality assurance plan to ensure that site-specific considerations are addressed; and

e. Conduct a site walk-around to verify that the design criteria, plans, and specifications are understood and to review material and equipment storage locations.

The preconstruction inspection and meeting shall be documented by a designated person and minutes should be transmitted to all parties.

2. Prefinal inspection

Upon preliminary project completion Owner/Operator [Respondent] shall notify EPA for the purposes of conducting on prefinal inspection. The prefinal inspection will consist of a walk-through inspection of the entire project site. The inspection is to determine whether the project is complete and consistent with the contract documents and the EPA approved corrective measure. Any outstanding construction items discovered during the inspection will be identified and noted. Additionally, treatment equipment will be operationally tested by the Owner/Operator [Respondent]. The Owner/Operator [Respondent] will certify that the equipment has performed to meet the purpose and intent of the specifications. Retesting will be completed where deficiencies are revealed. The prefinal inspection report should outline the outstanding construction items, actions required to resolve items, completion date for these items, and date for final inspection.

3. Final inspection

Upon completion of any outstanding construction items, the Owner/Operator [Respondent] shall notify EPA for the purposes of conducting a final inspection. The final inspection will consist of a walk-through inspection of the project site. The prefinal inspection report will be used as a checklist with the final inspection focusing on the outstanding construction items identified in the prefinal inspection. Confirmation shall be made that outstanding items have been resolved.

D. Sampling Requirements

The sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems as addressed in the project specifications should be presented in the CQA plan.

E. Documentation

Reporting requirements for CQA activities shall be described in detail the CQA plan. This should include such items as daily summary reports, inspection data sheets, problem identification and corrective measures reports, design acceptance reports, and final documentation. Provisions for the final storage of all records also should be presented in the CQA plan.

TASK XV: REPORTS

The Owner/Operator [Respondent] shall prepare plans, specifications, and reports as set forth in Tasks XII throuagh Task XV to document the design, construction, operation, maintenance, and monitoring of the corrective measure. The documentation shall include, but not be limited to the following:

A. Progress

The Owner/Operator [Respondent] shall at a minimum provide the EPA with signed, [monthly, bimonthly] progress reports during the design and construction phases and [semi-annual] progress reports for operation and maintenance activities containing:

1. An description and estimate of the percentage of the CMI completed;

2. Summaries of all findings;

3. Summaries of all changes made in the CMI during the reporting period;

4. Summaries of all contacts with representative of the local community, public interest groups or State government during the reporting period;

5. Summaries of all problems or potential problems encountered during the reporting period;

6. Actions being taken to rectify problems;

7. Changes in personnel during the reporting period;

8. Projected work for the next reporting period; and

9. Copies of daily reports, inspection reports, laboratory/ monitoring data, etc.

B. Draft

1. The Owner/Operator [Respondent] shall submit a draft Corrective Measure Implementation Program Plan as outlined in Task XII;

2. The Owner/Operator [Respondent] shall submit draft Construction Plans and Specifications, Design Reports, Cost Estimates, Schedules, Operation and Maintenance plans, and Study Reports as outlined in Task XIII;

3. The Owner/Operator [Respondent] shall submit a draft Construction Quality Assurance Program Plan and Documentation as outlined in Task XIV, and

4. At the "completion" of the construction of the project, the Owner-/Operator [Respondent] shall submit a Corrective Measure Implementation Report to the Agency. The Report shall document that the project is consistent with the design specifications, and that the corrective measure is performing adequately. The Report shall include, but not be limited to the following elements:

   a. Synopsis of the corrective measure and certification of the design and construction;

   b. Explanation of any modifications to the plans and why these were necessary for the project;

   c. Listing of the criteria, established before the corrective measure was initiated, for judging the functioning of the corrective measure and also explaining any modification to these criteria;

   d. Results of facility monitoring, indicating that the corrective measure will meet or exceed the performance criteria; and

   e. Explanation of the operation and maintenance (including monitoring) to be undertaken at the facility.

   This report should include all of the daily inspection summary reports, inspection summary reports, inspection data sheets, problem identification and corrective measure reports, block evaluation reports, photographic reporting data sheets, design engineers' acceptance reports, deviations from design and material specifications (with justifying documentation) and as-built drawings.

C. Final

The Owner/Operator [Respondent] shall finalize the Corrective Measure Implementation Program Plan, Construction Plans and Specifications, Design Reports, Cost Estimates, Project Schedule, Operation and Maintenance Plan, Study Reports, Construction Quality Assurance Program Plan/Documentation and the Corrective Measure Implementation Report incorporating comments received on draft submissions.

[THE FOLLOWING FACILITY SUBMISSION SUMMARY MAY BE PLACED IN THE BODY OF THE ORDER OR PERMIT AND REMOVED FROM THE SCOPE OF WORK. NOT ALL OF THE ITEMS LISTED BELOW MAY BE REQUIRED AT EACH FACILITY].

Submission Summary

A summary of the information reporting requirements contained in the Corrective Measure Implementation Scope of Work is present below:

Facility Submission	Due Date
Draft Program Plans (Task XII)	[DATE]
Final Program Plans (Task XII)	[NUMBER] days after EPA comment on Draft Program Plans
Design Phases (Task XIII A)	
- Preliminary Design (30% completion)	[NUMBER] days after submittal of Final Program Plan
- Intermediate Design (60% completion)	[NUMBER] days after submittal of Final Program Plan
- Prefinal Design (95% completion)	[NUMBER] days after submittal of Final Program Plan
- Final Design (100% completion)	[NUMBER] days after submittal of Prefinal Design
(Task XIII B through G)	
- Draft Submittals	Concurrent with Prefinal Design
- Final Submittals	Concurrent with Final Design
Additional Studies: Interim Report (Task XIII F)	[DATE ESTABLISHED PRIOR TO FINAL DESIGN]
Additional Studies: Final Report (Task XIII F)	[NUMBER] days after EPA comment on Interim Report
Draft Construction Quality Assurance Plan (Task XIV)	Prior to construction
Final Construction Quality Assurance Plan (Task XIV)	[NUMBER] days after EPA comment on Draft Construction Quality Assurance Plan
Construction of Corrective Measure(s)	As approved in Final Design
Prefinal Inspection Report (Task XIV)	[NUMBER] days after Prefinal Inspection

Facility Submission	Due Date
Draft CMI Report (Task XV)	Upon completion of construction phase
Completion of Construction	As approved by EPA in the Corrective Measure Design
Final CMI Report (Task XV)	[NUMBER] days after EPA comment on Draft CMI Report
Progress Reports for Tasks XII through XIV	[MONTHLY, BI-MONTHLY]
Progress Reports During Operation and Maintenance	[SEMI-ANNUAL]